REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1-18 and 20-22 remain pending. Claim 22 has been revised to correct a clear editorial error. The observation angle for the second group in claim 22 has been corrected to track the corresponding feature in claim 1.

Claims 1-18 and 20-22 have been rejected as obvious over Bailey and Hedblom. Applicants respectfully submit that the rejection misinterprets the references and the present claims, and therefore traverse the rejection.

The rejection contends at page 3 lines 5 to 11 that Bailey discloses an enclosed lens type retroreflective sheet that includes "a first glass sphere group that provides reflective performance at a small observation angle of 2° or less (col. 7, ln. 39 at -4°; as illustrated in Fig. 7, Curve A, between approx. 0° and 20°) and up to a large incidence angle of from 5° to less than 90° (col. 7, ln. 13 at 5°) and a second glass sphere group that provides reflective performance at an observation angle greater than 2° (col. 7, ln. 39 at -4°) and up to a large incidence angle of from 5° to less than 90° (col. 7, ln. 13 at 5°; as illustrated in Fig. 7, Curve A, between approx. 20° and 50°) in the same focusing layer (Fig. 3)." (Emphasis added). Applicants respectfully disagree with this interpretation.

Initially, it is appropriate to review the significance of the observation angle. The observation angle is the angle formed by the irradiation axis of projected light and the observation axis, i.e., the angle γ in FIG. 7 of the present application, and refers to the angle at which reflected light can be observed (see paragraph [0003] on page 2 and paragraph [0025] on page 12 of the present specification).

When, for example, viewing a sign from an automobile, the observation angle is an angle between the position of the headlights of the automobile and the position of the eyes of a driver as an observer formed with respect to the surface of a retroreflective sheet. Since the relative positions of the automobile headlights and the driver's eyes are constant, the observation angle increases as the automobile comes closer to the sign. For example, in the case of a passenger automobile, the vertical distance between the positions of the headlights and the driver's eyes tends to be about 50 to 60 cm. Thus, the observation angle is about 0.2° when the sign is 200 m ahead, about 1° when the sign is 50 m ahead, and 4° or greater when the sign is 10 m or closer.

In the case of a larger truck, the position of the driver's eyes is substantially higher than that in the case of a passenger automobile, so that the difference in the level of the driver's eyes relative to the headlights tends to be about 1 to 1.5 m. Thus, the observation angle is correspondingly larger than that in the case of a passenger automobile for a given distance from the sign.

When the observation angle increases slightly from 0.2° to 2°, it has been expected that the reflection performance is degraded significantly. For example, note Table 1 in paragraph [0134] at page 41 of the present specification, which shows the class 1 reflective performance requirements set forth in JIS. While the reflective performance is 70 at an incidence angle of 5° and an observation angle of 0.2°, the reflective performance is as low as 5.0 at an observation angle of 2°. Further, while the reflective performance is 30 at an incidence angle of 30° and an observation angle of 0.2°, the reflective performance is as low as 2.5 at an observation angle of 2°. Thus, a slight increase in the observation angle has been considered to cause significant reflective performance degradation. For information, in the case of a large truck, the observation angle is as large as 4° at a distance of about 25 m, and becomes larger as the distance decreases. Therefore, it is important to maintain reflective performance at an observation angle greater than 2°.

Fig. 7 of Bailey shows reflective performance ONLY for an observation angle of 0.2°, and not an observation angle greater than 2° as the properties recited for the second glass sphere group in claims 1 and 22 require. The rejection's error in citing the value of -4° in column 7, line 39 as an indication of an <u>observation</u> angle greater than 2°, is clear since Bailey describes this to be an <u>incidence</u> angle of -4° at column 7, line 39. Bailey's discussion of the <u>incidence</u> angle of -4° in no way describes any observation angles corresponding to an <u>observation</u> angle greater than 2°. See also Col. 6, line 8 of the reference. As seen in Fig. 7 of the reference, Bailey is evaluating reflective performance at varying <u>incidence</u> angles with only a constant observation angle of 0.2°, and does not evaluate reflective performance at an observation angle greater than 2°.

As mentioned above, Table 1 in paragraph [0134] at page 41 of the present specification shows the class 1 reflective performance requirements set forth in JIS. While the reflective performance is 70 at an incidence angle of 5° and an observation angle of 0.2°, the reflective performance is as low as <u>5.0</u> at an observation angle of 2°. Further, while the reflective

performance is 30 at an incidence angle of 30° and an observation angle of 0.2°, the reflective performance is as low as 2.5 at an observation angle of 2°. Since curves A to D in Fig. 7 of Bailey all show reflective performance that is greater than 70 at an incidence angle of 5° and greater than about 60 even at an incidence angle of 30°, the reflective performance reported by Bailey is consistent with an observation angle in Fig. 7 of 0.2°, and not 2° or greater. Therefore, Bailey in no way suggests the presence of a second glass sphere group that plays a role in maintaining reflective performance at an observation angle greater than 2° and up to a large incidence angle of from 5° to less than 90° as required by claims 1 and 22.

While Bailey considers reflective performance at incidence angles at an observation angle of only 0.2°, for the present invention, reflective performance is measured at varying incidence angles at respective observation angles of 2°, 4°, and greater than 4°. Bailey does not consider observation angles of 2°, 4°, and greater than 4° unlike the present specification, and neither describes nor suggests that reflective performance could be maintained at an observation angle greater than 2°.

Bailey's express teachings contradict any conclusion of a second sphere group as required by claims 1 and 22. Bailey teaches that its product is made by embedding all of the spheres in the material that eventually forms the surface layer (element 10a in the figures) to a depth less than half the average diameter of the spheres. The extreme edges of the non-embedded portions specifically are aligned in a common plane (col. 2, lines 16-20 and col. 4, lines 52-57). A spacing layer, which can be considered to correspond to the focusing layer of claim 1 (element 19c) then is applied to the surface with the protruding spheres. As seen at col. 2, lines 42-62, the purpose of the reference is to make the spacing layer uniform. Bailey cannot provide the second sphere group required by claim 1, which provides reflective performance at the larger observation angle and up to a large incidence angle, and in fact teaches away from the requirement in claims 1 and 22 for the focusing layer to be thinner at the glass spheres of the second sphere group than the focus formation position for those glass spheres.

The advantageous properties of the present invention are illustrated further in the accompanying Declaration of Mr. Yukawa, one of the present inventors. The Declaration shows reflective performance results for reflective material of the present invention and that of a typical enclosed lens type retroreflective sheet. With reference to the Tables and moving pictures on the

disk attached to the Declaration (the Tables include still images from the disks), it can be seen that the materials of the present invention showed significantly improved performance at observation angles greater than 2°, due to the presence of the second glass sphere group. Moreover, the visual illustration of the relationship between the observation angle and the incidence angle should be helpful in understanding the discussion of observation angle and incidence angle in this paper. The Declaration also shows that the improved properties of the present materials have been recognized by the industry, as evidenced by the sales.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

Respectfully submitted,

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